# Operating Instructions

## Residual current circuit-breaker with integral overcurrent protection

**> 8562/5**

STAHL

# 1 Contents



# 2 General Information

## 2.1 Manufacturer


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Germany

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Internet: www.stahl-ex.com


## 2.2 Operating Instructions Information


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Publication Code: 2014-06-04·BA00·III·en·08
Subject to alterations.


## 2.3 Symbols

**Warning!**
This symbol indicates advice which, if ignored, puts your health or the ability of the device or components to function at risk.

**Note**
This symbol indicates important additional information, tips and recommendations.

# 3 Safety Instructions

The most important safety instructions are summarized in this section.
They supplement the corresponding regulations which the staff responsible must study.

When working in areas, subject to explosion hazards, the safety of personnel and plant depends on complying with all relevant safety regulations. Assembly and maintenance staff working on installations therefore have a particular responsibility.
They require precise knowledge of the applicable standards and regulations.

As a user, please observe:
- national safety and accident prevention regulations,
- national assembly and installation regulations (e.g. IEC/EN 60079-14),
- generally recognised technical regulations,
- safety instructions and information in these operating instructions,
- characteristic values and rated operating conditions on the rating and data plates,
- instruction plates on the unit,
- that any damage can invalidate the Ex-protection.

Use the devices **in accordance with their designated use** and for their intended purpose only (see “Function“ on page 3).
Incorrect or impermissible use or non-compliance with these instructions invalidates our warranty provision.
No modifications or alterations to the devices impairing their explosion protection are permitted. The devices must only be fitted and operated if they are undamaged, dry and clean.

# 4 Conformity to Standards

Conformity with standards and regulations is specified in the corresponding certificates and declarations of the manufacturer (e.g. EC Declaration of Conformity).
These documents are available for download in the download area on the internet page www.stahl-ex.com.

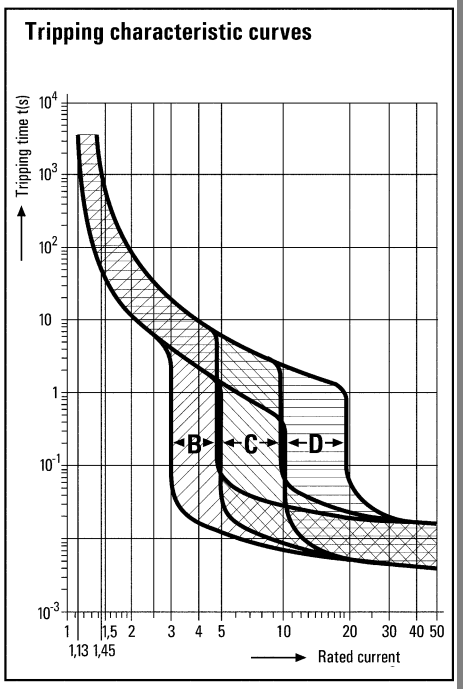
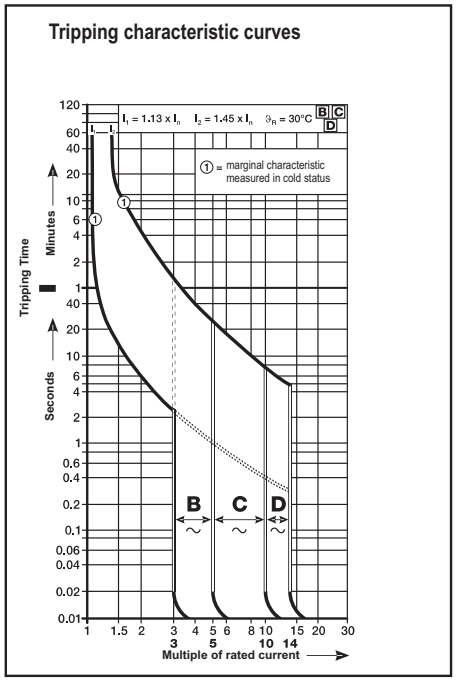
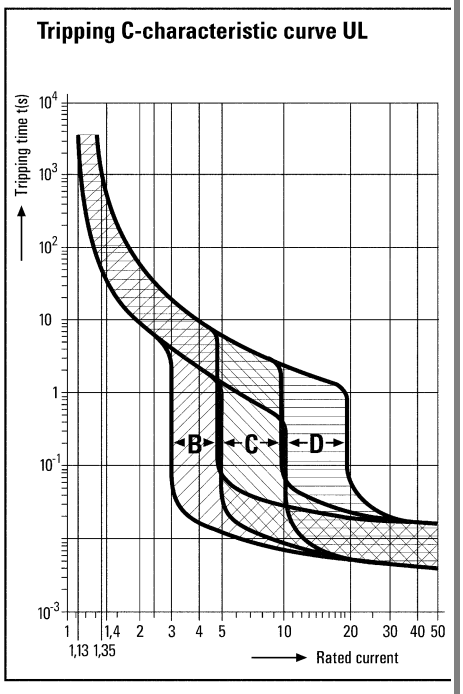
☞ The devices are approved for use in hazardous areas of Zones 1 and 2.

# 5 Function

The series 8562 residual current circuit-breaker with overcurrent protection is used in hazardous areas and protects cables against overload and short-circuit, and also personnel by limiting the duration of residual currents by switching off.
It is designed for fitting into an enclosure with type of protection “Increased safety e“.

# 6 Technical Data

| | | | | |
|---|---|---|---|---|
| Type | **8562/5** | | **8562/54-246.-...**<br>**8562/54-247.-...**<br>**8562/54-248.-...** | |
| Explosion protection | | | | |
| Gas explosion protection | | | | |
| ATEX | ⟨Ex⟩ II 2 G Ex d e IIC Gb<br>⟨Ex⟩ I M 2 Ex d e I Mb | | ⟨Ex⟩ II 2 G Ex d e IIC Gb<br>⟨Ex⟩ I M 2 Ex d e I Mb | |
| IECEx | Ex d e IIC<br>Ex d e I | | Ex d e IIC<br>Ex d e I | |
| Certificates | | | | |
| ATEX | PTB 02 ATEX 1049 U | | PTB 02 ATEX 1049 U | |
| IECEx | IECEx PTB 06.0062U | | IECEx PTB 06.0062U | |
| Electrical data | | | | |
| Rated insulation voltage | 500 V | | 500 V | |
| No. of poles | 1 pole + N; 2 pole | | 2 pole | |
| Rated operational voltage | 127 ... 230 V AC | | 133 ... 230 V AC<br>125 V DC with 2 contact strips connected in series | |
| Minimal voltage $U_{bmin}$ | 1-pole + N:<br>2-pole: | 100 V AC<br>127 V AC | 2-pole: | 12 V AC; 12 V DC |
| Maximal voltage $U_{bmax}$ | 250 V AC; 53 / 120 V DC | | 253 V AC | |
| Rated working and leakage currents | $I_N$ = 6 ... 40 A;<br>$I_{\Delta N}$ = 10 / 30 / 100 / 300 mA | | $I_N$ = 6 ... 40 A;<br>$I_{\Delta N}$ = 10 / 30 / 100 / 300 mA | |
| Tripping time at rated residual current | 1 x 1.4 $I_{\Delta N}$ ≤ 300 ms<br>5 x 1.4 $I_{\Delta N}$ ≤ 40 ms | | 1 x 1.4 $I_{\Delta N}$ ≤ 300 ms<br>5 x 1.4 $I_{\Delta N}$ ≤ 40 ms | |
| Working area of the control unit | 180 ... 255 V | | 180 ... 255 V | |
| Rated frequency | 50 ... 60 Hz | | 50 ... 60 Hz | |
| Impact strength | 250 A, 8 / 20 µs | | 250 A, 8 / 20 µs | |
| Service life | | | | |
| Mechanical | $2x10^4$ switching cycles | | $2x10^4$ switching cycles | |
| Electrical | $10^4$ switching cycles | | $10^4$ switching cycles | |
| Utilization category | A (acc. to IEC/EN 60947-2) | | A (acc. to IEC/EN 60947-2) | |
| Isolation function | yes (IEC/EN 60947-2) | | yes (IEC/EN 60947-2; IEC/EN 60898-1; EN/DIN 60664-1) | |
| Pulse resistance | 6 kV | | ≤ 6,2 kV | |

| | | |
|---|---|---|
| Type | **8562/5** | **8562/54-246.-...**<br>**8562/54-247.-...**<br>**8562/54-248.-...** |
| Tripping characteristic curves |  <br>08903E02 |  <br>12463E02 |
| |  <br>11514E02 | |
| Selectivity class | 3 (acc. to IEC/EN 60898) | 3 (acc. to IEC/EN 60898) |

Rated switching capacities

| | Poles | Series with 6 kA | | | Series with 10 kA | | | Series with 25 kA | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Voltage (V) | Current (kA) | | Voltage (V) | Current (kA) | | Voltage (V) | Current (kA) |
| AC acc. to IEC/EN 60898 | 1 - 2 | $I_{cn}$ / $I_{cs}$ | 230 / 240 | 6 | $I_{cn}$ | 230 / 240 | 10 | $I_{cn}$ | -- | -- |
| | 2* | -- | -- | -- | $I_{cn}$ | 230 | 10 | $I_{cn}$ | 230 | 25 |
| AC acc. to IEC/EN 60947-2 | 1 | $I_{cu}$ | 240 | 10 | $I_{cu}$ | 240 | 15 | $I_{cu}$ | -- | -- |
| | 1+N, 2 | $I_{cu}$ | 127 | 30 | $I_{cu}$ | 127 | 40 | $I_{cu}$ | -- | -- |
| | | | 240 | 20 | | 240 | 30 | | -- | -- |
| | 2* | -- | -- | -- | $I_{cu}$ | 230 | 25 | $I_{cu}$ | 230 | 25 |
| DC acc. to IEC/EN 60947-2 (time constant 15 ms) | 1 | $I_{cu}$ / $I_{cs}$ | 60 | 20 | $I_{cu}$ / $I_{cs}$ | 60 | 25 | $I_{cu}$ / $I_{cs}$ | -- | -- |
| | 2 | | 125 | 25 | | 125 | 30 | | 125 (5 ms) | 15 (5 ms) |
| DC acc. to IEC/EN 60898 (time constant ≤ 4 ms) | 2 | -- | -- | -- | | 125** | 10 | | 125 (5 ms) | 15 (5 ms) |

*) only for type 8562/54-2465-160-4; 8562/54-2475-160-4; 8562/54-2480-160
**) with series circuit of 2 poles

| Type | **8562/5** | **8562/54-246.-...**<br>**8562/54-247.-...**<br>**8562/54-248.-...** |
|---|---|---|
| Breaking capacity | 6 resp. 10 kA 2 pole;<br>10 kA 1 pole + N (25 kA to IEC) | 10 kA 2 pole;<br>25 kA 2 pole (only Type 8562/54-2480-160) |
| Version | Type A, pulse current sensitive to IEC/EN 61009 | |

Characteristics

| Characteristic to IEC/EN 60898 | B | C |
|---|---|---|
| Rated current range | 6 ... 40 A | 6 ... 40 A |
| Loads | > Electric heatings<br>> Lighting<br>> Socket outlet circuits<br>> Control circuits<br>e.t.c. | > Operating equipment<br>> Light fitting groups<br>> Motors<br>> Transformers<br>e.t.c. |
| Normal temperature | 30 °C | 30 °C |
| Thermal overload trip | 1.13 ... 1.45 $I_n$ | 1.13 ... 1.45 $I_n$ |
| Magnetic trip | 3 ... 5 $I_n$ | 5 ... 10$I_n$ |

Short circuit protection

Back-up protection with preceding fuse

| Miniature circuit-breaker | | Preceding fuse type gG for tripping characteristic | | |
|---|---|---|---|---|
| | | C | B | B, C |
| Type | Rated current $I_N$ [A] | min. rated current [A] | | max. rated current [A] |
| 8562/5 | 1 | 4 | -- | -- |
| | 2 | 8 | -- | 63 |
| | 3 | 10 | -- | |
| | 6 | 20 | 10 | 80 |
| | 10 | 25 | 16 | |
| | 16 | 40 | 20 | |
| | 16* | -- | -- | 100* |
| | 20 | 50 | 32 | 100 |
| | 25 | 63 | 40 | |

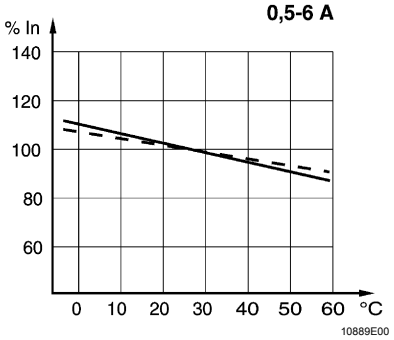
*) Only types: 8562/54-2465-160-4; 8562/54-2475-160-4; 8562/54-2480-160

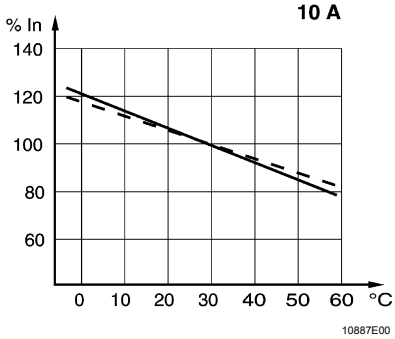
Ambient temperature

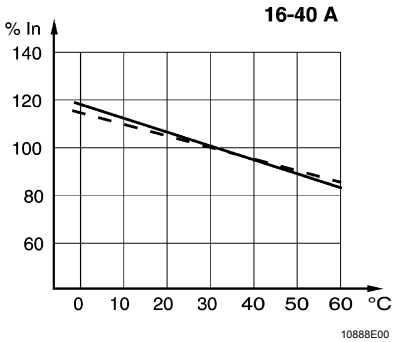
- 20 ... + 60 °C In case of different temperature range please consider correction factor!

Correction factors

**Correction factors for ambient temperatures other than 30 °C**




Terminals

| | |
|---|---|
| Main contacts | 1.5 ... 10 $mm^2$ clamp terminals |
| Auxilliary contacts | 1.5 $mm^2$ clamp terminals |

Material

| | |
|---|---|
| Enclosure | Epoxy resin |

| Type | **8562/5** | **8562/54-246.-...<br>8562/54-247.-...<br>8562/54-248.-...** |
|---|---|---|
| Auxiliary contact | | |
| Version | see circuit diagrams | see circuit diagrams |
| Rated working voltage | max. 255 V AC | max. 255 V AC |
| Rated working current | 5 A at 230 V AC<br>1 A at 60 V DC | 2 A at 230 V AC<br>1 A at 400 V AC<br>2 A at 60 V DC |
| Coupling relais | | |
| Coil tension $U_B$ | 220 V | -- |
| Minimum switching current | 10 mA | -- |
| Minimum switching current | 5 A | -- |
| Switching capacity | min. 250 mW | -- |

☞ Please contact the manufacturer if operating conditions are non-standard.
Further technical data is given in the STAHL catalogue or is available upon request.

☞ The temperature class depends upon where the protective enclosure is installed.

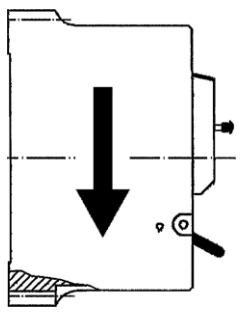
☞ Change the Miniature Circuit-Breaker at the end of its service-life to guarantee ongoing protection!

☞ Upstream fuse/downstream Miniatur Circuit-Breaker for back-up protection
$I_{cc\ max}$: 100 kA (80 kA, 400 V with fuse)

# 7 Arrangement and Assembly

⚠ These circuit-breakers are explosion-protected devices to IEC/EN 60079-0.
They must be fitted into an enclosure with type of protection increased safety “e“, e.g. enclosure Type 8146/5 from R. STAHL Schaltgeräte GmbH.

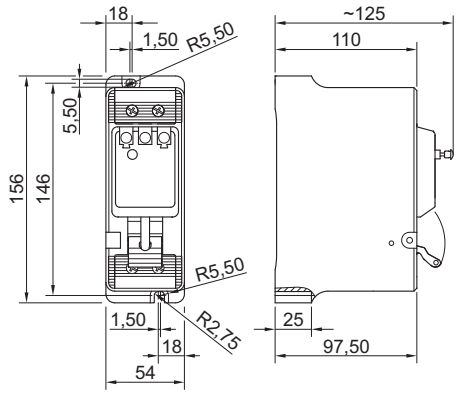
## 7.1 Mounting Orientation




Vertical,
Handle at the bottom

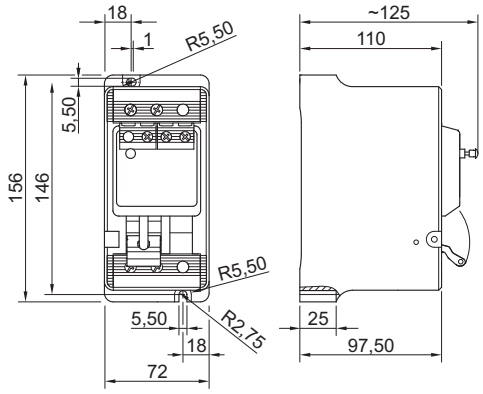
## 7.2 Dimensional Drawings

**Dimensional Drawings** (All Dimensions in mm) - Subject to Alterations



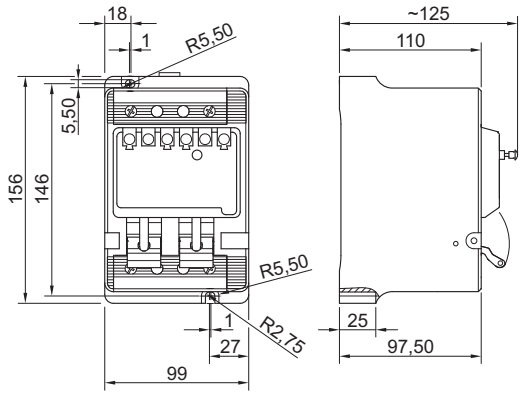

12464E00

**8562/54-..., 1 pole + N**



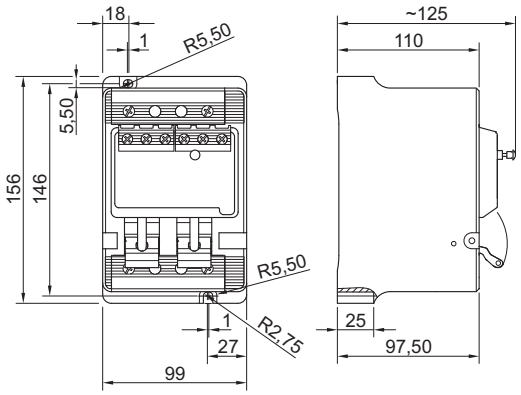

12465E00

**8562/54-..., 1 pole + N with aux. contact**



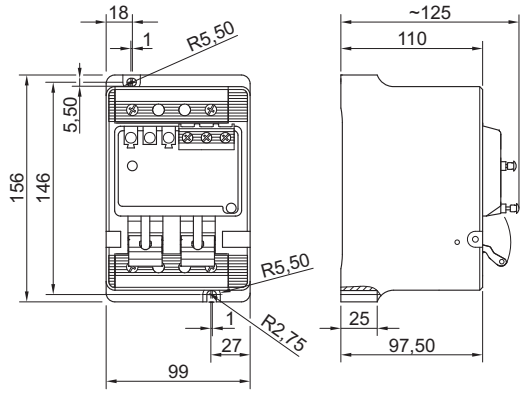

12466E00

**8562/54-..., 2 pole**




12467E00

**8562/54-..., 2 pole**




12468E00

**8562/54-..., 2 pole with aux. contact and reset function**

# 8 Installation

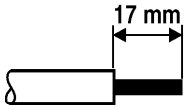
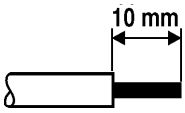
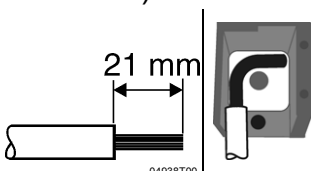
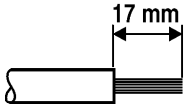
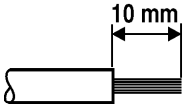
## 8.1 Main Connection

Connect the cables with particular care.
Choose suitable cables and route them accordingly to ensure that the maximum permissible conductor temperatures are not exceeded.
To ensure that creepage distances are maintained remove precisely 10, 17 or 21 mm of insulation (see chapter “Rated connection cross-section“).
The conductor must not be damaged (scored) when stripping the insulation!
Only heat-resistant cables must be used, if connected directly.

## 8.2 Rated connection cross-section

Solid, stranded or finely stranded copper wires can be used. 1 or 2 wires of the same cross-section can be fitted under one terminal. Both wires must be made of the same material. No preparation is necessary prior to connecting the wires.

☞ When terminal sleeves are fitted, they must be applied with a suitable tool.

| Conductor | Main contact terminals | Auxiliary contact terminals |
|---|---|---|
| single-wire | 2 x 1.5 ... 10 mm²*   04935T00 | 2 x 0.75 ... 2.5 mm²   04937T00 |
| | 1 x 10 mm² (bend the end of the conductor)   04938T00 04939T00 | |
| stranded or flexible-stranded | 2 x 1.5 ... 6 mm²   04940T00 | 2 x 0.75 ... 1.5 mm²   04941T00 |
| Permissible tightening torques for the options mentioned* | 3,0 Nm | 1.0 ... 1.2 Nm |
| *Permissible tightening torques for 10 mm² single-wire cable | 3,0 Nm | |

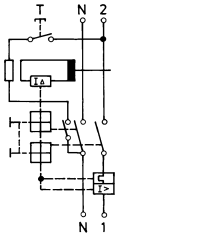
Notice: Auxiliary contacts can be led out through the main contact terminals.

- observe the cross-sections
- note the terminal marking

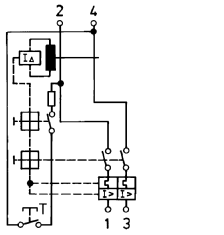
**Note**
As part of the installation procedure, the tight fit of the clamping connection must be checked according to IEC/EN 60079-14, -17.
If necessary, the clamping connections must be retightened to the relevant torques.

## 8.3 Connection diagrams

**Circuit diagrams**

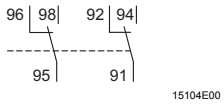



1-pole+N



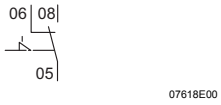

2-pole


Auxiliary contact 1 W

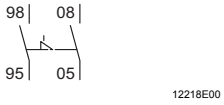



Auxiliary contact 2 W

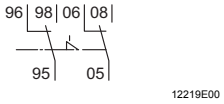
*)



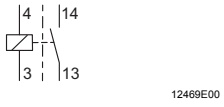

Fault signalling contact 1 W with reset function for fault signal




Auxiliary contact 1 S
Fault signalling contact 1 S




Auxiliary contact1 W
Fault signalling contact1 W




Connecting relay
Auxiliary contact 1 S

*) only for types 8562/54-2465-160-4 and 8562/54-2475-160-4: After the circuit breaker has been activated, the fault-contact can be reset manually.

Connect the device according to the rating plate. It has to be taken care that the neutral conductor is connected correctly.

# 9 Commissioning

Before commissioning, ensure that:

- the device has been installed in accordance with the standards,
- the connections have been correctly made,
- the device is not damaged,
- all screws and nuts are fully tightened.

# 10 Maintenance

## 10.1 Maintenance

Maintenance and repair work on the devicess may only be carried out by appropriately authorized and trained personnel.
Before any work commences, the devices must be disconnected from the supply.

**Function test of FI switches/circuit breakers**

- For function testing in the on-state, press the test key “T“. The FI switch/circuit breaker must be triggered immediately.

☞ The function test must be performed regularly, at least once semiannually, as long as there are no other regional or customer-specific requirements for additional testing.

☞ Observe the relevant national regulations in the country of use!

The following items must be checked as part of the maintenance schedule:

- Check that no cable connections are loose.
- Check the plastic enclosure for cracks or other visible signs of damage.
- Check that the permitted temperatures, in accordance with IEC/EN 60079-0, are adhered to.
- Check the reset function of the switch lever.
- Check that the device functions correctly.

**Maintenance Intervals**

Check explosion-protected components regularly to ensure that its fitting, installation and operation are in accordance with the regulations.

Refer to the corresponding national regulations (e.g. IEC/EN 60079-14) for the type and scope of tests. The maintenance intervals must be chosen, such that the occurrence of deficiences, anticipated in the system, can be avoided.

Note the following when establishing the intervals between checks:

- the operating conditions (degree of utilization of the Miniatur Circuit-Breaker, maloperation)
- manufacturers’ instructions in technical documentation (mechanical and electrical service life)
- major changes in the whole system (e.g. changes of zone allocation)

**Remedial Action**

Any defects, which affect the explosion protection, must be remedied immediately:

- Take the device out of operation! (Disconnect it from the supply!)
- Replace the device!

# 11 Transport and Storage

Transport and Storage are only permitted in the original packing.

# 12 Disposal

Observe the national standards for refuse disposal.

# Konformitätserklärung
*Declaration of Conformity*
*Déclaration de Conformité*

**R. STAHL Schaltgeräte GmbH • Am Bahnhof 30 • 74638 Waldenburg, Germany**
**erklärt in alleiniger Verantwortung,** *declares in its sole responsibility, déclare sous sa seule responsabilité,*

| | |
|---|---|
| **dass das Produkt:**<br>*that the product:*<br>*que le produit:* | **Schutzschalter**<br>*Circuit breaker*<br>*Disjoncteur* |
| **Typ(en)**, *type(s), type(s):* | **8562/5.-....-...** |

**mit den Anforderungen der folgenden Richtlinien und Normen übereinstimmt.**
*is in conformity with the requirements of the following directives and standards.*
*est conforme aux exigences des directives et des normes suivantes.*

| Richtlinie(n)<br>*Directive(s)*<br>*Directive(s)* | Norm(en)<br>*Standard(s)*<br>*Norme(s)* |
|---|---|
| **94/9/EG:** **ATEX-Richtlinie**<br>*94/9/EC: ATEX Directive*<br>*94/9/CE: Directive ATEX* | EN 60079-0:2009<br>EN 60079-1:2007<br>EN 60079-7:2007 |
| **Kennzeichnung,** *marking, marquage:* | **Ⓔx II 2 G Ex d e IIC Gb**<br>**I M2 Ex d e I Mb** **0158** |
| **EG-Baumusterprüfbescheinigung:**<br>*EC Type Examination Certificate:*<br>*Attestation d'examen CE de type:* | **PTB 02 ATEX 1049 U**<br>(Physikalisch-Technische Bundesanstalt,<br>Bundesallee 100, 38116 Braunschweig, Germany) |
| **Produktnormen nach Niederspannungsrichtlinie:**<br>*Product standards according to Low Voltage Directive:*<br>*Normes des produit pour la Directive Basse Tension:* | EN 60947-1:2007 + A1:2011<br>EN 60947-2:2006 + A1:2009<br>EN 61008-1:2004 + A11:2007 + A12:2009<br>EN 61009-1:2004 + Cor.:2006 + A11:2008 ... A13:2009 |
| **2004/108/EG: EMV-Richtlinie**<br>*2004/108/EC: EMC Directive*<br>*2004/108/CE: Directive CEM* | Nicht zutreffend nach Artikel 1, Absatz 3.<br>*Not applicable according to article 1, paragraph 3.*<br>*Non applicable selon l'article 1, paragraphe 3.* |

Spezifische Merkmale und Bedingungen für den Einbau siehe Betriebsanleitung.
*Specific characteristics and how to incorporate see operating instructions.*
*Caractéristiques et conditions spécifiques pour l'installation voir le mode d'emploi.*

*Waldenburg, 2012-05-31*

***Ort und Datum***
*Place and date*
*Lieu et date*

i.V. J. Rückgauer

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*Director Research and Development*
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